

REPORT ON A COLLECTION OF INSECTS OF THE ORDER TRICHOPTERA FROM SIAM AND CHINA

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The trichopterous fauna of Szechwan is a very interesting and apparently very rich one. Nearly all the species found proved to be new. It is not a typically Chinese fauna, but resembles more that of the eastern Himalayas and of Tibet.

The material herein described is all in the United States National Museum. The Chinese portion was collected by Dr. D. C. Graham, of Suifu, Szechwan Province, China, while the Siamese specimens were taken by Dr. W. L. Abbott.

Family RHYACOPHILIDAE

Genus RHYACOPHILA Pictet

RHYACOPHILA SINENSIS, new species

PLATE 1. FIGURES 1, 2

Description.—Head and thorax brown. Anterior femora brownish, median and posterior ones yellowish; anterior and median tibiae brown, with yellow markings; posterior tibiae yellowish; tarsi brownish. Abdomen brownish, yellowish beneath. Anterior wings brownish, with indistinct pale reticulation; second apical fork a little basad of the first. Posterior wings subhyaline, pterostigma opaque; second apical fork beginning clearly earlier than the first one. *Male*: Ninth tergite with a long, narrow median process, which is directed downward and somewhat dilated at its apex. The hind margin of the ninth tergite at the sides of the median process is blackish and forms two small projections directed backward. Inferior appendages¹ brownish; the basal joint, viewed laterally, is broad; second joint subdivided by a broad triangular excision into two lobes, the upper one broad, subtriangular, the lower one of the

¹ I use this term for *pedes genitales* of authors.

same length, but only about one-half as broad. Seen from above, both these lobes are narrow, somewhat dilating to their rounded ends. Penis long and very slender, somewhat curved in S-shape; titillators a little shorter, but also long and slender, acute at their ends; both penis and titillators brown. Length of body, 9 mm.; that of the anterior wings, about 13 mm.

Allied to *Rhyacophila hobsoni* Martynov (Tibet).

Type.—Male, U.S.N.M. No. 43156, collected at Yellow Dragon Temple, near Songpan, Szechwan, 11,000 to 14,000 feet altitude, July 25–28, 1924.

Specimens examined.—One, the type.

RHYACOPHILA species

Description.—Anterior wings brown, with distinct pale irrora-tions; second apical fork a little basad of the first, but the footstalks of both forks are short, much shorter than in preceding species; the forking of Rs in the posterior wings is similar to that in the anterior ones. Apparently a distinct species. Length of body, 7 mm.

Specimens examined.—One female, from Yellow Dragon Temple, near Songpan, Szechwan, 11,000 to 14,000 feet altitude, July 17–20, 1924.

Genus GLOSSOSOMA Curtis

GLOSSOSOMA ANALE, new species

PLATE 1, FIGURES 3 TO 7

Description.—Head and thorax brown above; antennae yellow, with brownish annulations; apical portion darker; palpi brownish. Side of thorax yellowish. Femora yellow; tibiae brownish yellow; tarsi also somewhat brownish; spurs 1, 4, 4, long, brown. Abdomen brown above, ochraceous beneath; genital segments dark yellow. In females tibia and basal tarsal joint of the median legs dilated; spurs similar to those in male, long, dark brown. Anterior wings (male) somewhat brownish, resembling those of *G. valvatum* Ulmer; discoidal cell somewhat elongated; media approximated to CuA in its basal portion, but united with it at a point only; M_{3+4} approximated at its base to CuA₁; CuP² slender; A₁ and A₂ thick, distinct; A₂ arcuate and strongly convex backward, inclosing with A₁ a large subelliptical opaque area. The venation of the posterior wings is similar to that of *G. valvatum* Ulmer, but the discoidal cell is somewhat longer; second apical cell narrow at its base; third apical fork twice as long as its footstalk.

² CuP is a term I introduce for A₁ of authors, changing their A₂–A₄ to A₁–A₃, respectively.

Male: Ninth dorsal segment very broad, forming above a broad, subtriangular projection; ventral portion very narrow, covered by the eighth segment; seventh sternite forming a transverse arcuate platelike projection; the base of the sixth sternite provided with a large platelike appendage, almost square, if seen in front, but its hind margin appears as if broken.

The tenth segment is divided into two lateral portions, each of which is also divided by a deep oval excision into two lobes or processes. Upper, or inner, processes are long, slender, and acute at their ends, curved downward (if viewed laterally). Lateral lobes are much shorter, triangular from side, rounded at their ends above, bearing numerous long hairs. These lateral lobes are united at their bases with large basal pieces, forming internally two other lobes, similar to these, but shorter, pale, and bearing several stiff blackish curved hairs.

Unpaired median process of the ninth tergite long and broad, its left margin straight, the right one convex, arcuate; apical portion narrow, almost claw-shaped, with apex directed to the right side. Penis not exerted in our specimens. In the female the wing venation is similar to that in the male, except the anal region. There is but a small tooth on the sixth sternite. Length of body, 5.5 to 6.5 mm.; expanse, 16 mm.

In the structure of male genital segments this species resembles *Glossosoma valvatum* Ulmer, but differs obviously by the configuration of anal region in the anterior wings, as well as by the structure of the tenth segment.

Type.—Male, U.S.N.M. No. 43163.

Specimens examined.—Two males and two females, including the type, from Shin Kai Si, Mount Omei, Szechwan, July 1–27, 1922; one male, from Shin Kai Si, Szechwan (4,400 feet), July, 1922.

GLOSSOSOMA CAUDATUM, new species

PLATE 1, FIGURES 8 TO 11

Description.—Head and thorax blackish brown above, with yellowish hairs. Antennae yellow, with brown annulations, which are broader than in *G. anale*; distal portion of antennae brownish, basal joint testaceous. Thorax brownish yellow laterally; legs dark yellow. Abdomen brownish above, yellow beneath; ninth and tenth segments yellow. Anterior wings brownish or fumose; their venation is similar to that of *G. anale*, differing chiefly in the configuration of the anal region. A_1 sinuate; A_2 directed rather downward, to the base of the "anal callosity"; this structure is very distinct, transverse, pale yellow, raised upward.

Male: Ninth dorsal segment not so broad as in *G. anale*, its posterior margin being only feebly convex, if seen dorsally. Transverse

projection of the seventh sternite as in that species; appendix of the sixth sternite very large, longer than in *G. anale*, but narrower, forming an elongated plate, truncate at its end.

Tenth segment divided into two lateral portions, as in *G. anale*. Basal part of each lateral portion broad, forming, laterally, a rounded ventral angle, bearing several black stiff hairs; upper and inner part produced into a long and thick process, narrowing to its apex if viewed laterally; seen from above, each of these portions is thickened in the middle, apical portion excised and thus forming two small blackish teeth. Both lateral portions of the tenth segment are united in their basal portions by the median pale and unchitinized membranous portion. Internally one may make out two small projections of the tenth segment, but they are invisible externally. The unpaired process of the ninth sternite is broad and triangular in its basal portion, but its distal portion is slender, fingerlike and long, clothed with yellow hairs. Above it is a very long process, slender, rodlike, and somewhat thickened in its distal portion; apically it bears a small slender appendix, acute at its end. This structure belongs to the penis. Length of body, 5 mm.

This is a very distinct species, but apparently allied to both *Glossosoma anale* and *G. valvatum*.

Type.—Male, U.S.N.M. No. 43164.

Specimens examined.—Two males, from Shin Kai Si, Mount Omei, Szechwan, July, 1922.

Family STENOPSYCHIDAE

Genus STENOPSYCHE McLachlan

STENOPSYCHE LAMINATA Ulmer

Length of anterior wings is 21.5–22.2 mm.; color pale yellowish, with numerous brown transverse bands, but usually without large spots; postcostal area mostly pale but with traces of reticulation. Described originally from China.

Specimens examined.—Two males and two females, from Shin Kai Si, Mount Omei, June, 1921; two females, Shin Kai Si, Mount Omei (4,400 feet), September, 1921; one male, Shin Kai Si, Mount Omei (without date).

STENOPSYCHE GRAHAMI, new species

PLATE 1, FIGURES 12, 13

Description.—A rather large form, allied and similar to *Stenopsyche navasi* Ulmer. Body yellowish brown. Head clothed with yellowish and whitish hairs; antennae yellow with brown reticula-

tion. Legs yellow; anterior and median legs somewhat reddish, with broad, dark-brown markings. Anterior wings with dark-brown reticulation, forming sometimes two large, distinct, brown spots—one in the middle of the wing, the other nearer to the base. In the specimen from Suifu the basal portion of the wings is also dark brown. Apical portion triangular, but not extended. Hind wings pale, whitish, with apical portion somewhat fumose. *Male*: Lateral portions of the ninth segment large, broad, triangular, posteriorly extended, forming two fingerlike hairy processes. Tenth segment transverse, shorter than in *S. navasi* Ulmer. Its median portion forms a distinct elevation above; seen from above, it is triangular at its base, but narrow in its distal part. The apical portion of this elevation is surrounded by a yellow platelike structure, forming a median tonguelike process, not very long. Lateral portions of the tenth segment broad, above, posteriorly with two pairs of short processes, one pair near the median tongue-shaped process, the other one at the middle of the hind margin; hind outer portions somewhat tuberculated, with several bristles. Upper portions of the inferior appendages long, straight in their basal portions (behind the tenth segment, above), then curved outward; apical portions somewhat thickened and forming, externally, two short prominences or processes, somewhat varying in length. Lower portions of the inferior processes also rather long; seen from beneath they are narrow, with apical margin obliquely truncate. Preanal appendages long, hairy, as usual. Penis with two minute acute appendages at its apex. Length of body, 18 to 20 mm.; expanse, 55 to 61 mm.

This species, doubtless, is allied to *S. navasi* Ulmer (Tient-Tsuen, in Shantung). The tenth segment is formed on the same plan, but its median portion in *navasi* is extended backward much more than in *grahami*. Upper portions of the inferior appendages in *navasi* shorter, strongly curved outward, knee-shaped, if seen from above.

Type.—Male, U.S.N.M. No. 43153.

Specimens examined.—Two females and one male, from Shin Kai Si, Mount Omei, Szechwan; one female, same locality (4,400 feet), July 1-14, 1921; one male, same locality, July 17, 1922; one female, same locality (6,000 to 7,500 feet), August 21, 1921; one male, same locality (5,000 to 11,000 feet), August 24-27, 1921; one female, Suifu, Szechwan, September 6 to October, 1921.

STENOPSYCHE SIAMENSIS, new species

PLATE 2, FIGURES 14, 15

Description.—Body reddish brown. Head reddish, with reddish-yellow antennae; ocelli distinct. Legs reddish yellow, anterior and

median ones with usual dark markings. Anterior wings somewhat shorter than usual, with obliquely truncated apical margin. Coloring much paler than usual; the brown reticulation is represented chiefly by a series of short transverse stripes and a few brown spots, partly anastomosing; in the region of the discoidal cell and pterostigma a rather large pale spot, and a little nearer to the base is placed a second pale spot between C and Rs; postcostal area and anal areas also pale. Posterior wings in their ano-jugal region not so dilated as in the remaining species; apical portion a little darker, yellowish.

Male: Side pieces of the ninth segment broad, but shorter than the tenth segment, upper posterior angle forming a short and narrow triangle. Tenth segment large and of a very composite structure. It forms two side and one median ventral portion; the last-mentioned part forms two long and thick (if seen from above) processes, directed posteriorly; their tips are curved upward, slender and acute. The lateral portions are broad above, as well as laterally, and at their base there is, above, an oval convexity; their apical portions each form three or four slender processes, one ventral, one (or two) lateral, and one dorsal; upper processes longer than the other and directed obliquely upward and inward, with apices acute and crossing each other. Preanal appendages long and almost straight. Lower portions of the inferior appendages stick-shaped, but rather short. Upper portions very short; basally they are directed upward, as in other species, but almost immediately divide into two slender processes; the lower portion is short, directed posteriorly, with acute apex, turned upward; the upper process is longer, rod-shaped, directed obliquely upward, with somewhat thickened apical portion. Penis not exerted in our specimens.

The plates and processes of tenth segment are somewhat polished and brownish; the inferior appendages are also somewhat brownish. Length of body, 10 to 11 mm.; expanse, 24 to 26 mm.

Remarks.—This is a small and peculiar form, differing chiefly by the shape of its wings and by the short, forking upper portion of the inferior appendages. In the configuration of the lateral portions of the ninth segment, however, as well as in the structure of the tenth segment, one may appreciate some resemblance to *denticulata* and *longispina* of Ulmer. In *denticulata* the tenth segment is differentiated into two side, and one median portion, but the side portions are slender, the median portion is entire, with but short end processes. In *longispina* the side portions of the tenth segment form similar dorsal processes, crossing each other, but the median portion is also entire and long. In any case *siamensis* is allied to the group

of species *denticulata*, *longispina*, and *similis* of Ulmer, though representing a very distinct species.

Type.—Male, U.S.N.M. No. 43154.

Specimens examined.—Two males, from Khow Sai, Trong, Lower Siam, January-February, 1899.

Family HYDROPSYCHIDAE

Genus MACRONEMA Pictet

MACRONEMA FASTOSUM Walker

The specimen examined belongs to the color variety of *Macronema fastosum* var. *fasciatum* Albarda; apical portion of the anterior wing, behind anastomosis, is of the same dark-yellow color as its basal portion; fuscous stripe somewhat dilated anteriorly.

Specimens examined.—One male, from Khow Sai, Dow (1,000 feet), Trong, Lower Siam, January-February, 1899.

Genus HYDROPSYCHE Pictet

HYDROPSYCHE APPENDICULARIS, new species

PLATE 2, FIGURES 16 TO 18

Description.—Head brownish, clothed with golden-brownish hairs. Thorax brownish; anterior legs brownish, median and posterior ones paler, yellowish; in the females the tibia and tarsus of the median legs are dilated, but not very strongly; anterior legs slender, feeble. Anterior wings pale brownish, irrorated with numerous, partly confluent, hyaline spots, so they may be called pale yellowish, reticulated with brownish; pale spots clothed with golden-yellow hairs. Posterior wings pale; median cell closed. Fringe of the apical margin of anterior wings yellowish with blackish interruptions. Abdomen brownish above, paler beneath. *Male*: Ninth tergite with a short triangular median projection, the dorsal plate (tenth segment) forming two pairs of short posterior projections; the upper projections are subtriangular, rounded dorsally, slender from side, bearing short hairs at their ends. Lower projections shorter but broader and rounded; at their outer edge they form two very long slender processes, nearly reaching the ends of the inferior appendages; viewed laterally they are curved upward, then downward and backward. Basal joint of the inferior appendages long and somewhat thickened in their apical portions; second joint short, slender, curved inward. From the apical portion of the penis arises, beneath, a rather long lobe, which by a deep excision is divided into two nar-

row secondary lobules; basal portion of the lobe is slender, in the shape of a pedicel. At the sides of this pedicel are placed two projections, with acute proximal ends directed basally. Length of body, 6.5 mm.

This is a very distinct species.

Type.—Male, U.S.N.M. No. 43165.

Specimens examined.—One male, from Shin Kai Si, Mount Omei, Szechwan; one male and one female, same locality, July 1-17, 1922.

HYDROPSYCHE PENICILLATA, new species

PLATE 2, FIGURES 19 TO 21

Description.—Head brownish yellow, with yellowish hairs. Antennae yellow with broad dark annulations; palpi brown. Eyes prominent, black. Thorax yellowish brown; anterior legs brownish, median and posterior ones yellow. Anterior wings brown, with distinct small pale spots, bearing groups of golden-yellow hairs; hind margin truncate. Posterior wings pale, becoming blackish gray apically; median cell open; first apical fork small, sometimes lacking. Abdomen dark brown above, brownish beneath, tenth segment (male) yellowish brown, inferior appendages yellowish. *Male*: Ninth tergite triangularly produced. Tenth segment large, its hind margin with a shallow median excision, at the sides of which arise two slender rod-shaped processes, directed somewhat downward and inward; the tips of these processes reach the ends of the basal joints of the inferior appendages and bear minute setae. Basal joint of the inferior appendages long, somewhat thickened in its distal portion; second joint gradually tapering to its apex. Penis of a very complex structure. Its apical portion appears to be tubular, truncate at its tip, containing, in its interior, two brushes of blackish setae. From the base of this apical portion arise two small lateral processes, bearing at their ends two minute spinules, which are directed basally. Before the end, the upper portion of the penis is raised upward in the shape of two nearly oval prominences; a little nearer to the base there are two more small lateral projections. Length of body, 6.5 mm.

This is a peculiar species, somewhat resembling *Hydropsyche columnata*, new species, in the structure of the tenth segment and of the inferior appendages, but it is quite distinct.

Type.—Male, U.S.N.M. No. 43167.

Specimens examined.—One male (July-August, 1922) and one female (?) (March-April, 1925) from Suifu, Szechwan.

HYDROPSYCHE COLUMNATA, new species

PLATE 2, FIGURES 22 TO 24

Description.—Head yellowish above, laterally brown; antennae yellow with brownish annulations; palpi testaceous. Thorax dark yellow. Legs dark yellowish with long brownish spurs. Anterior wings testaceous, with paler irrorations, clothed with golden-rufous hairs. Abdomen brownish, paler beneath. *Male:* Ninth tergite with a broad triangular projection. Tenth segment subquadrate, above, resembling somewhat that in *Hydropsyche penicillata*, with two analogous posterior processes, but these processes are here much thicker, directed backward and somewhat clavate if seen from above. Inferior appendages with long basal and short distal joints, basal joint gradually thickening to its end. The end of penis produced beneath into a large lower lobe or valve, which by a deep rounded excision is subdivided into two lateral lobes; both these lobes are narrow at their bases, dilated and capitate in their distal portions. Above the base of the lower lobe are placed two dark rounded projections. Length of body, 6 mm.

This is a distinct species, somewhat resembling *Hydropsyche appendicularis*, new species, and *H. penicillata*, new species, but more evidently allied to *Hydropsyche valvata* Martynov, from southwestern Siberia.

Type.—Male, U.S.N.M. No. 43166, from Shin Kai Si, Mount Omei, Szechwan, July 1-17, 1922.

Specimens examined.—One, the type.

Genus HYDROMANICUS Brauer

HYDROMANICUS INTERMEDIUS, new species

PLATE 2, FIGURES 25 TO 27

Description.—The specimen examined is somewhat defective; the anterior wings were partly broken, and abdomen was separated. Closely allied to *Hydromanicus frater* Ulmer and perhaps in lesser degree to *Hydatopsyche melli* Ulmer.

Head and thorax dark brown above; anterior portion of the head (clypeus) clothed with very short whitish pubescence. Antennae long, slender, yellowish, with dark spiral line in their basal portion; distal portion with brown annulations. Thorax brownish yellow at sides; legs yellow, with long yellow spurs; fifth joint of tarsi with two distinct claws. Anterior wings yellowish, with brownish reticulation, forming indistinct transverse fasciae, partly anastomosing along

the veins, where the brown color is more distinct. Venation brown; at cross veins there are mostly brownish spots; a somewhat paler spot is placed between DC and the end portion of CuP, occupying the distal portion of MC. SC unites at its end with R and thus a short common vein is formed, ending very near to Rs; first apical fork rather long, discoidal cell short; median cell long, fourth apical fork beginning nearly at the same level with the third fork; cross vein between basal portions of M_2 and M_3 placed quite as in *Hydatopsyche melli*. *Male*: Tenth segment formed as in *H. frater* Ulmer, but longer; its basal portion, seen from above, is broad, triangular; distal portion elongated; its apical portion is divided by a median fissure into two portions, as in *H. frater*; before this apical portion is placed, above, a minute tooth. Lateral appendages of the tenth segment are long, directed upward, and very slender; they are rod-shaped, without hairs. Inferior appendages resembling those in *Hydatopsyche melli* Ulmer; basal joint very obliquely truncate at its apex, which is somewhat dilated; second joint rather slender, in its distal portion curved upward and inward. Penis thick and long, in structure somewhat similar to that of *Hydromanicus frater* and *Hydatopsyche melli*; its end portion is divided by a deep excision above into two side portions, which are broad, if seen from side, with rounded convex upper posterior margin; from the base of this end portion arise, below, two slender appendages, which are curved nearly in a knee-shaped manner, if seen from side; these processes are shorter than the upper lobes. Length of body, 6.6 mm.

Remarks.—In the structure of the tenth segment, and partly of the penis, this species is similar to *Hydromanicus frater* Ulmer, but in the structure of the inferior appendages, and of the lateral processes of the tenth segment, which are very long and slender, it reminds one more of *Hydatopsyche melli* Ulmer. In the anterior wings the subcosta is confluent apically with R, as in *melli*, but the short, common portion ends not on Rs_1 , but on the anterior margin, close to Rs_1 . Discoidal and median cells as in *Hydromanicus frater*, but the third fork begins earlier, and M_2 and M_3 are connected by a cross vein as in *Hydatopsyche melli*. Thus *intermedius* is really an intermediate form between these species, proving that the genus *Hydatopsyche* Ulmer is very closely allied to *Hydromanicus frater* Ulmer with its allies, and perhaps may be united with it.

Type.—Male, U.S.N.M. No. 43155, from between Mount Omei and Mount Wa, Szechwan (2,000 to 8,000 feet), 1922.

Specimens examined.—One, the type.

HYDROMANICUS species

Specimen examined is without abdomen.

Head and thorax brown, with yellow hairs above; legs dark yellow, tibiae and tarsi somewhat darker. Anterior wings brown with minute pale spots or dots, clothed with yellow hairs. Venation similar to that in *Hydromanicus frater* Ulmer, but Sc and R are united at their ends and the short common portion, Sc+R, reaches the margin of wing near Rs₁.

Specimens examined.—One female, from Shin Kai Si, Szechwan, July 1-17, 1922.

Family CALAMOCERATIDAE

Genus ASOTOCERUS McLachlan

ASOTOCERUS OCHRACEELLUS McLachlan

PLATE 2, FIGURES 28 to 31

Asotocerus ochraceellus McLACHLAN, TRANS. ENT. SOC. LONDON, ser. 3, vol. 5, p. 255, pl. 17, fig. 2, pl. 19, fig 2, 1866.

Description.—Shape of wings and general coloration as in McLachlan's description; posterior wings apparently somewhat darker, grayish. Wing venation differs somewhat from that of McLachlan's Plate 19, Figure 2, but McLachlan's figure is not quite precise. Anterior wings long, narrow; discoidal cell long, narrow; median cell equal to it in length. In posterior wings first apical fork arises much basad of the second one; third apical fork long, with very short pedicel. *Male*: Tenth segment roof-shaped, elongated, with broadly excised or concave upper margin, if seen from the side; apical margin truncate. Preanal appendages oval, hairy. Inferior appendages very long and slender; their distal portions curved arcuately inward and very slender; second joint coalesced with the first and any boundary between them is not perceptible. Length of body, 8 to 8.5 mm.; expanse 28 to 32 mm.

Remarks.—This form probably belongs to *Asotocerus ochraceellus*. Dr. M. Mosely, of London, kindly compared one of the specimens with the type in the British Museum and informed me that the wing venation in our specimen is very similar to that in the specimen in the British Museum; but one should not forget that the genital appendages in this species are not described. A positive identification needs careful comparison of these structures.

Asotocerus ochraceellus is known from Borneo and Java.

Specimens examined.—One male from Trong, Lower Siam, January-February, 1899; two males from Khow Sai, Dow (10,000 feet), Trong, Lower Siam, January-February, 1899.

Family LIMNOPHILIDAE

Genus PSEUDOSTENOPHYLAX Martynov

PSEUDOSTENOPHYLAX FUMOSUS Martynov GRAHAMI, new subspecies

PLATE 3, FIGURES 32 TO 37

Description.—Apical margin of anterior wings not so regularly rounded as in the typical form from Ordos, the apex being somewhat produced. Coloring of anterior wings is not diffuse; it can be described as brown, with numerous pale irrorations; sometimes dark reticulation is distinct only along the longitudinal veins, the median portions between two neighboring veins being pale. Rs_1 arises from the discoidal cell a little earlier than in the typical form; the veins Cu, A, M, R, and both main branches of Rs slenderer and somewhat paler than in the typical form. Posterior wings as in the typical form; the areas between A_3 and jugal vein (vena arcuata) clothed, in male, with numerous rounded scales, as in *Pseudostenophylax fumosus*.³

Male: Eighth segment as in typical form, but the posterior median portion of it bears numerous strong brownish hairs or spines, turned mostly downward; black spinules are disposed as usual. Preanal appendages pale, not projecting very much behind the ninth segment. Penis large, forming an angular projection backward, then suddenly bent to the body, truncate at its apex, if seen from above. Basal portions of titillators thick, pale, and erectile; distal portions chitinized, brownish, tuberculated, at their end each bearing a brush of long spines, directed outward and to the body.

Female: Females were unknown in the typical form. Anterior wings grayish brown, with numerous small, rounded, pale irrorations; shape of wings as in male; veins somewhat yellowish and a little more slender than in male. Scales on the posterior wings lacking. Abdomen brownish above, yellowish beneath.

Seventh sternite with a transverse chitinized projection. Upper side-pieces of the ninth tergite large, triangular, but rounded at their hind angles; their lower edges are almost straight; dorsal part of the ninth tergite is weak, narrow, and almost completely coalesced with the tenth segment. Ventral portion of the ninth segment forms a broad plate, gradually tapering to its hind margin, the outer angles of which are somewhat projected. Median lobe of the subgenital apparatus small, rounded, dark, side lobes almost twice as long, with obliquely truncated hind margins. Tenth seg-

³ In Ann. Mus. Zool. Acad. Sci. St. Petersburg, vol. 14, pp. 281–287, 1909, vena arcuata is named A_5 .

ment subdivided by the median fissure into two lateral portions, bearing hairs; their inner portions form two, nearly contiguous, slender processes, directed backward. Side portions of the tenth segment, seen from the side, form two subtriangular projections above the side pieces of the ninth segment; seen from beneath these projections prove to be curved inward, in the shape of two transverse narrow plates. Length of body, male, 11 to 12 mm.; female, 12.5 mm.

Remarks.—This form differs from *Pseudostenophylax fumosus* from Ordos⁴ by the dense brush of spines on the eighth tergite, by the presence of but few hairs on the ninth segment, by Rs arising a little earlier, by much more distinct reticulation in the anterior wings, and by more slender and paler longitudinal veins. The shape of the inferior appendages is somewhat varying. Position of Rs_1 is also not quite constant, and there are some intermediate conditions.

The structure of female genital segments recalls those of *P. szechwanensis* Martynov.

Type.—Male, U.S.N.M. No. 43160, from Uen Chuan, Szechwan.

Specimens examined.—One male, from Mount Omei (5,000 to 11,000 feet), Szechwan, August 24–27, 1921; one male and one female, from Yellow Dragon Temple, near Songpan (11,000 to 14,000 feet), July 20–24, 1924; one male, from Uen Chuan, Szechwan, 1921.

PSEUDOSTENOPHYLAX DIFFICILIS, new species

PLATE 3, FIGURES 38 TO 42; PLATE 4, FIGURES 43, 44

Description.—Head yellowish anteriorly, yellowish brown above; vertex somewhat elevated, forming between the bases of antennae a rounded prominence with a third ocellus at its apex; hairs brownish, mixed with yellowish anteriorly. Antennae brown, with yellow annulations, basal joint yellow. Prothorax yellowish brown; mesonotum brown in the middle, almost black at its sides; coxae brownish, femora and tibiae yellow, the anterior and median ones with brownish spots; tarsi yellow, but the bases and ends of the joints, except the end of the fifth, are brownish; posterior tarsi yellow, somewhat brownish at their bases; last tarsal joint with a few spinules; spines black. Anterior wings obliquely rounded at their apical margin; apical portion comparatively large; ground color brown, irrorated with very numerous small rounded pale spots; veins yellowish. In the male C and R are very thick, in females more slender; discoidal

⁴ In Ann. Mus. Zool. Acad. Sci. St. Petersburg, vol. 19, p. 267, 1914, *P. fumosus* is indicated from South Siberia. I would note here that this indication is erroneous and is based on an incorrect label. Both male specimens, mentioned there, were taken also in Ordos, by N. Przewalsky.

cell long, not dilated in its apical portion, Rs_1 arising rather far from the end of it. Posterior wings comparatively feebly dilated in the anal region; membrane forming short prominences at the ends of A_1 , A_2 , A_3 ; the hairs of anal region thin, yellowish; apical portion comparatively long, as in forewings, discoidal cell long, RS arising before its end, as in the anterior wings; membrane granulose. Abdomen yellowish brown above, paler beneath.

Female: Genital segments formed as in *Pseudostenophylax minor* Martynov, but with some differences. Eighth segment large, with dark concave hind side-margins in its ventral portion, as usual. Ninth segment as in *minor*, but not so high; its ventral portion (supragenital plate) broad, but short, tapering hindwards; hind portion subdivided by a short narrow excision posteriorly into two rounded lobes; seen from the side it appears as being rather square, pale. Tenth segment is subdivided by a triangular excision posteriorly into two lateral portions, each forming a short and very slender pale process, with apex turned somewhat upward; beneath these processes the hind margin of the tenth segment, viewed laterally, forms an oval prominence, separated by a deep excision from the upper processes. Median lobe of the subgenital plate small, capitate, narrow at its base; side lobes dark, larger, truncate at their inner posterior edges, similar to those in *minor*.

Male: Eighth segment large as usual, in its posterior portion clothed above with minute black spinules. Preanal appendages rather long, cylindrical, brownish above and bearing several long erect black hairs. Ninth segment with concave posterior lateral margins; the portions corresponding to the lateral lines of abdomen are very thin and pale on hind portions of the segment, thus subdividing the sides of the ninth segment into dorsal and ventral portions; the dorsal portion is subtriangular and clothed with long hairs. Inferior appendages form two very broad plates, truncate and somewhat concave at their hind margins; at their base they are somewhat narrower than at their ends; hind portions with long hairs. Tenth segment forms a large projection backward, by the narrow and deep median excision posteriorly subdivided into two side portions; each of these portions forms above a strong brown thickening, triangular if seen from side; seen from above these thickenings appear to be narrow distally, but broad in their proximal portions; the proximal edges obliquely truncate and black. Penis not exerted in our specimens; its hind portion is rounded and brown; titillators composed of two portions, as usual; distal portions are long, arcuate, but slender toward their base especially; their hind outer edges bear rows of short spines and spinules. Length of body, 11 to 12 mm.

Remarks.—The structure of the female genital segments proves that this is rather closely related to *P. minor* Martynov⁵ from Kham, but distinct. Subgenital apparatus, supragenital plate, and the tenth segment are very much as in *minor*, but in this species the hind margins of the tenth segment do not form oval convexities below the apical processes, being invariably concave; the supragenital plate is also somewhat different. The male of *minor* unfortunately is unknown.

Type.—Male, U.S.N.M. No. 43159.

Specimens examined.—Two males and five females, from Yellow Dragon Temple, near Songpan (11,000 to 14,000 feet), July 20–28, 1924.

Genus NOTOPSYCHE Banks

NOTOPSYCHE RHOMBIFERA, new species

PLATE 4, FIGURES 45, 46

Description.—*Male:* Head, mesothorax, and metathorax black, prothorax reddish yellow; legs blackish brown, with yellow hairs; spurs yellow. Palpi, both pairs, long, black; basal joint short, second and third long. Anterior wings brownish, with brownish veins; pterostigmal region darker. Venation as in *Notopsyche nigripes* Martynov; discoidal cell long; fourth apical cell limited by an erect (not oblique) cross vein at its base, and nearly equal in breadth to the second one; fifth cell acute at its base. In the posterior wings the discoidal cell is also long. Membrane granulose.

Eighth tergite with a long median projection; preanal appendages concealed in its interior, but apparently high, as in *nigripes*. Inferior appendages in the form of two large, rhomboidal plates, clothed with hairs. Penis thick, broad; titillators strongly thickened in their basal portions, then rod-shaped, with thickened apices; they are thicker than in *nigripes*. Length of body, 8 mm.; expanse, 23 to 24 mm.

Remarks.—This species is allied to *N. ruficollis* Ulmer, *N. nigripes* Martynov, and *N. intermedia* Martynov, from which it differs chiefly by longer inferior appendages and by thicker titillators.

Type.—Male, U.S.N.M. No. 43162.

Specimens examined.—Two males, from Suifu, Szechwan, November–December, 1923.

⁵ Ann. Mus. Zool. Acad. Sci. St. Petersburg, vol. 14, p. 279, pl. 5, figs. 23–26, 1909 (*Allophylax* ? *minor* Martynov).

Genus PLATYPHYLAX McLachlan

PLATYPHYLAX species

Description.—Head and thorax reddish brown, mesonotum dark reddish in the middle, brown at sides; legs yellow with black spines; abdomen brownish above, paler beneath; hind portion pale. Anterior wings brownish, irrorated with very small pale spots; apical margin parabolic; discoidal cell long; first, second, and third apical forks angulate at bases; apical cell closed at its base by an oblique vein. Hind wings also with long discoidal cell. Length of body, about 12 mm.

Genital segments (eighth, ninth, and tenth) formed as in *Platyphylax rufescens* Martynov, from eastern Tibet, but they are not in good condition. At any rate, this form is closely allied to *rufescens*, but apparently distinct, differing by darker coloration of the head and thorax as well as by brownish anterior wings. Processes of the tenth segment apparently are somewhat thicker.

Specimens examined.—One female, from Yellow Dragon Temple, near Songpan (11,000 to 14,000 feet), July 25–28, 1924.

Genus STENOPHYLAX Kolenati

STENOPHYLAX species

Description.—Head and thorax reddish yellow, abdomen reddish brown; legs yellow with black spines; spurs 1, 3, 4, yellow; antennae reddish yellow. Anterior wings pale brownish, irrorated with minute pale yellow spots; costal, subcostal, and postcostal areas pale yellowish; apical portion triangular, somewhat produced at Rs_4 ; discoidal cell long, dilated at its end. The end of the abdomen in the female is formed somewhat like *Stenophylax permistus* McLachlan. Length of body, 13 mm.-

Remarks.—This species represents, probably, a new species, but it is impossible to describe adequately the formation of its genital segments, as they are not in good condition.

Specimens examined.—One female, from Mount Omei (5,000 to 11,000 feet), Szechwan, August 24, 1927.

Family SERICOSTOMATIDAE

Genus EODINARTHURUM, new genus

Male.—Basal joint of antenna thick, as long as the thorax, clothed with outstanding hairs and scales and, at least in the species here described, bearing two short processes. Basal joint of the maxil-

lary palpi in the male rather long, second joint approximately one-half as long, slender. Spurs 2, 4, 4, the inner ones a little longer than the outer ones. Anterior wings not very broad, resembling those of the genus *Dinarthrum* McLachlan, with similar venation, except the groove and apical veins; the groove along CuP is very deep, reaching the anastomosis and concealing M in its interior; discoidal cell long, Rs_4 apparently detached at its base from Rs_{3+4} and approximated to the end of the groove; behind it there are four apical branches, connected at their bases by an oblique vein; these branches represent probably two branches of M, CuA_1 , and A_1 . The portion of the wing anterior to the groove is clothed with minute blackish scales; apical portion clothed with hairs. Hind wings as in *Dinarthrum*. Male genital appendages resembling those of the genus *Dinarthrum*, but the second joint of the inferior appendages is longer, basal joint provided with a slender basal appendage; median portion of the tenth segment not produced downward.

Type species.—*Eodinarthrum pusillum*, new species.

EODINARTHURUM PUSILLUM, new species

PLATE 4, FIGURES 47 TO 51

The specimen examined is in poor condition; the wings are damaged, and I could not make a figure of the hind one.

Description.—Head brownish; basal joint of antennae yellowish brown, somewhat thickened on its distal portion, bearing two processes on the inner side, one basal and one distal, clothed with numerous outstanding blackish hairs; basal portion of the joint bears, together with hairs, a few elongated scales; antennae approximately as long as the body, brownish, with indistinct yellow annulations in its basal part. Maxillary palpi brownish, and clothed with outstanding hairs. Thorax and abdomen brownish; legs brownish, clothed with minute yellowish hairs; spurs 2, 4, 4, long. Anterior wings brownish, clothed with yellowish hairs in their apical and hind portions; anterior portion, between the groove and costal vein, clothed with blackish scales; discoidal cell long; the groove deep, concealing in its interior the greatest portion of M and of Cu; CuA_2 is apparently lacking, as in many species of *Dinarthrum*. Posterior wings dark grayish. *Male.* Dorsal plate of the tenth segment similar to that of the genus *Dinarthrum*, but the median (double) portion is somewhat more produced backward; if seen from the side it is nearly triangular, without forming any dilation or prominence (downward) in its apical portion. Basal joint of the inferior appendages similar to that in the genus *Dinarthrum*, but from its base arises upward an additional slender process, as in

the genera *Crunaeciella*, *Lepidostoma*, and *Mellomyia*; basal segment clothed with long hairs, in its apical portion especially. Second joint of the inferior appendages in its shape similar to that of *Dinarthrum*, but more elongated, almost equaling half the length of the first joint. Distal portion of the penis directed downward, as in *Dinarthrum*; titillators very slender. Length of body, 4 mm. *Female*: Unknown.

Remarks.—In the shape of its anterior wings the present species is similar to the genus *Dinarthrum*, but differs from it in a much deeper groove, concealing a portion of M and of Cu and extending up to the anastomosis. The general conformation of this groove resembles also that in the genus *Mellomyia* Ulmer (China), but in the latter genus this groove appears to be still deeper and conceals also Rs, up to the anastomosis; the arrangement of the branches of M and of Cu and A_1 in the genus *Mellomyia* is also somewhat different. The male genitalia in the genus *Mellomyia* are much more specialized than in our genus, though formed on a similar plan (except the absence of titillators). *Eodinarthrum pusillum* is doubtless related to the genus *Dinarthrum* McLachlan, but these relations are not close; in the structure of male genitalia, as well as in the wing venation, the genus *Dinarthrum* is more primitive than the genus *Eodinarthrum*.

The genus *Mellomyia* is also somewhat allied to *Eodinarthrum*, but is much more specialized; its relations to the last-named genus are more distant.

Type.—Male, U.S.N.M. No. 43158, from Yellow Dragon Temple, near Songpan (11,000 to 14,000 feet), July 17–20, 1924.

Specimens examined.—One, the type.

Genus GOERA Leach

GOERA DIGITATA, new species

PLATE 4, FIGURES 52, 53

Description.—Head and thorax rufous-yellow, clothed with somewhat thickened rufous-yellowish hairs. Basal joint of antennae long, the remaining ones very short, yellowish; palpi clothed with rufous-yellow hairs. Legs yellowish. Anterior wings clothed with short golden-yellowish hairs along the veins mixed with brownish ones, on the costa, especially; third apical fork almost reaching the level of the discoidal cell; second fork impinging not far on it. *Male*: Sixth sternite with a transverse row of nine thick spines, the median being the longest. Ninth sternite with a very long process, triangular in its basal, narrow in its distal portion. Pre-anal appendages long, slender, hairy, straight. Basal joint of the

inferior appendages very broad, with concave hind edge, if seen from the side; second joint similar to that of *Goera fissa* Ulmer (Kwantung), but its upper rod-shaped process is longer than in that species, and by a rounded excision beneath it separated from the lower triangular prominence, as in *Goera squamifera* Martynov. Tenth segment forming, above, a narrow plate, soon dividing into two long and slender brown processes, acute at their ends. Penis long and apparently resembling that in *Goera squamifera* Martynov. Length of body, 6 mm.

Remarks.—Judged by the structure of the male genitalia this species appears to be allied more to *Goera squamifera* Martynov.

Type.—Male, U.S.N.M. No. 43157.

Specimens examined.—Four males, from Suifu, Szechwan, March–April.

EXPLANATION OF PLATES

PLATE 1

FIGURES 1, 2. *Rhyacophila sinensis*, new species, male. Apex of abdomen from above and from side.

3–7. *Glossosoma anale*, new species, male. 3, Anterior wing; 4–6, apex of abdomen from above, from side, and from beneath; 7, process of seventh sternite.

8–11. *Glossosoma caudatum*, new species, male. 8. Basal portion of anterior wing; 9–10, apex of abdomen from above and from beneath; 10a, process of seventh sternite; 11, apex of abdomen, from side.

12, 13. *Stenopsyche grahami*, new species, male. Apex of abdomen from above and from side; 13a, inferior appendages from beneath.

PLATE 2

FIGURES 14, 15. *Stenopsyche siamensis*, new species, male. Apex of abdomen from above and from side; 15a, upper portion of inferior appendages.

16–18. *Hydropsyche appendicularis*, new species, male. 16 and 18, Apex of abdomen from above and from side; 17, penis and inferior appendages from beneath.

19–21. *Hydropsyche penicillata*, new species, male. 19, 20, Apex of abdomen from side and from above; 20a, end of penis, from above; 21, penis and inferior appendages from beneath.

22–24. *Hydropsyche columnata*, new species, male. Apex of abdomen from side, from above, and from beneath (penis and inferior appendages).

25–27. *Hydromanicus intermedius*, new species, male. 25, Distal portion of the fore wing; 26, 27, apex of abdomen from side and from above.

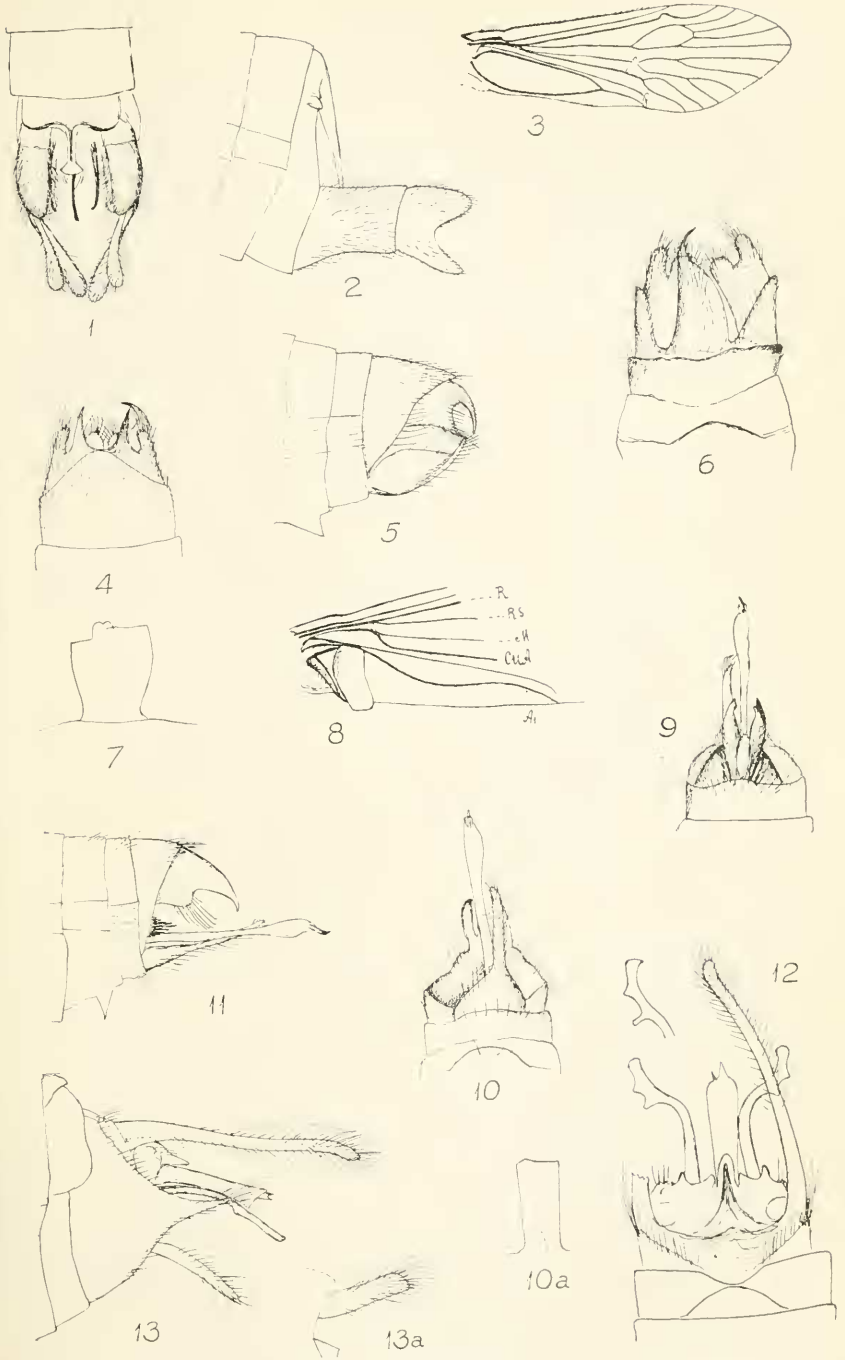
28–31. *Asotocerus ochraecclus* McLachlan (?), male. 28, Venation of anterior and posterior wings; 29–31, apex of abdomen from side, from above, and from beneath.

PLATE 3

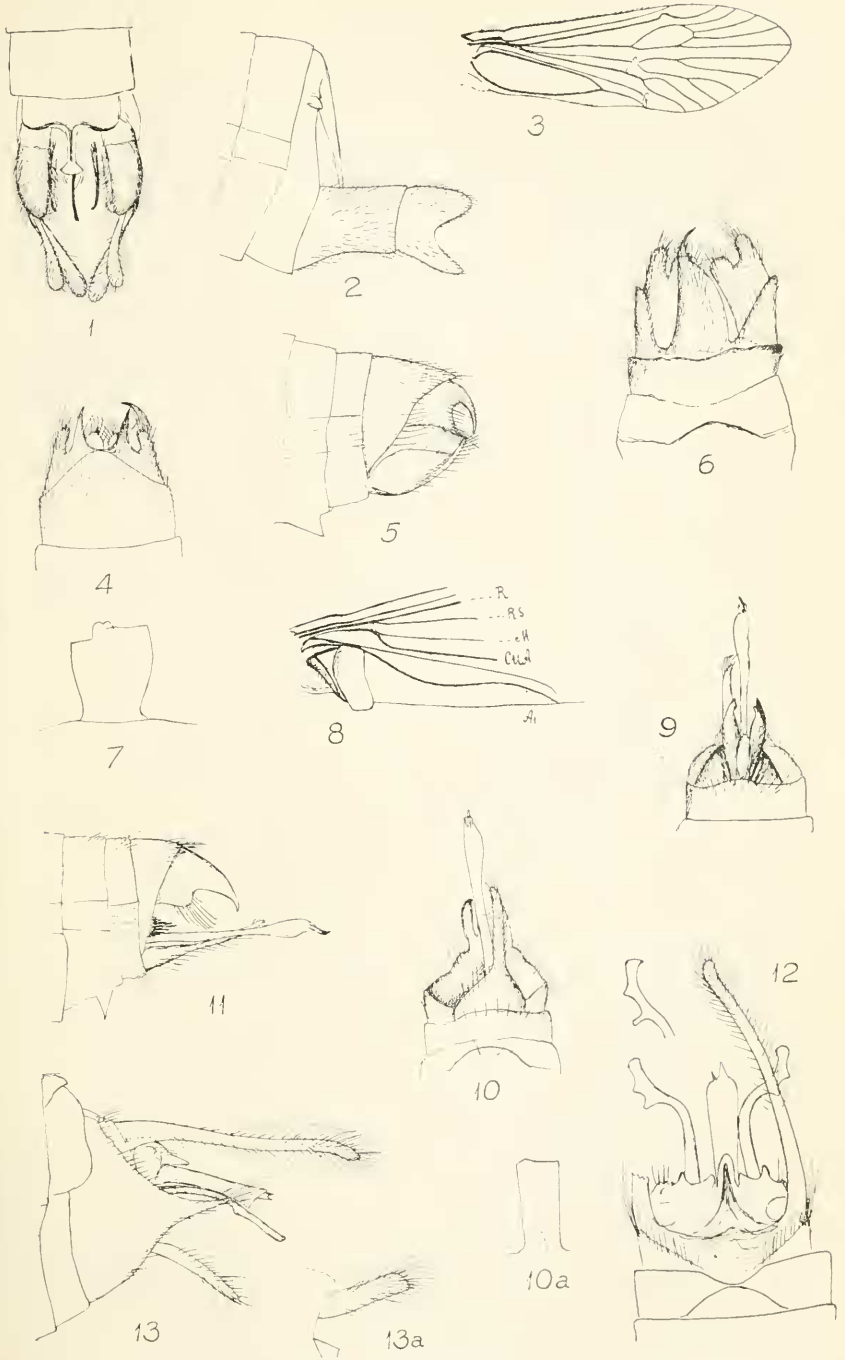
- FIGURES 32-37. *Pseudostenophylax fumosus* Martynov *grahami*, new subspecies. 32-34, Apex of male abdomen from above, from side, and from beneath; 35-37, apex of female abdomen from above, from side, and from beneath.
- 38-42. *Pseudostenophylax difficilis*, new species. 38, Venation of anterior wings; 39-41, apex of female abdomen from side, from above, and from beneath; 42, apex of male abdomen from side.

PLATE 4

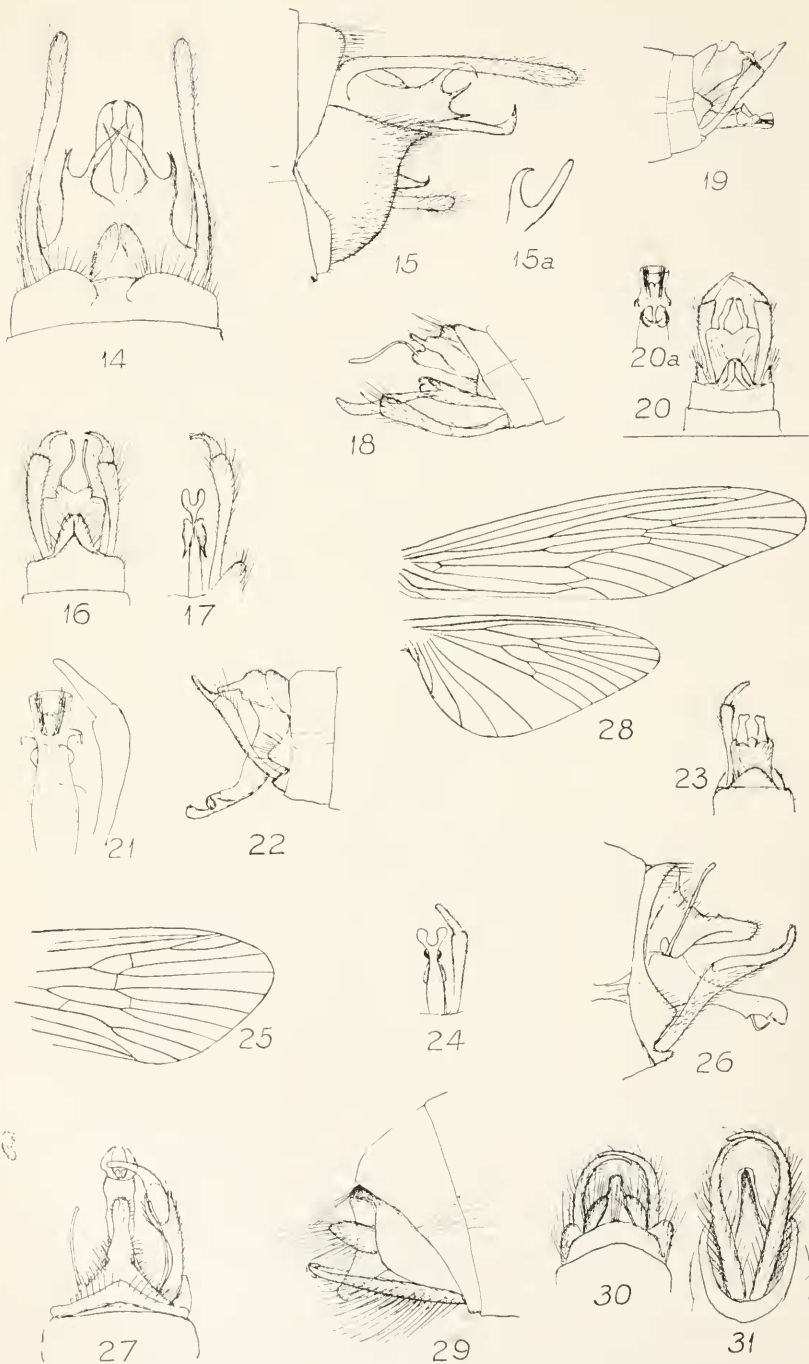
- FIGURES 43, 44. *Pseudostenophylax difficilis*, new species. Apex of abdomen from above and from beneath.
- 45, 46. *Notopsyche rhombifera*, new species, male. Apex of abdomen from side and from beneath.
- 47-51. *Eodinarthrum pusillum*, new genus and species, male. 47. Basal joint of antenna and maxillary palpus; 48, anterior wing; 49-51, apex of abdomen from side, from above, and from beneath.
- 52, 53. *Goera digitata*, new species, male. Apex of abdomen from side and from beneath.



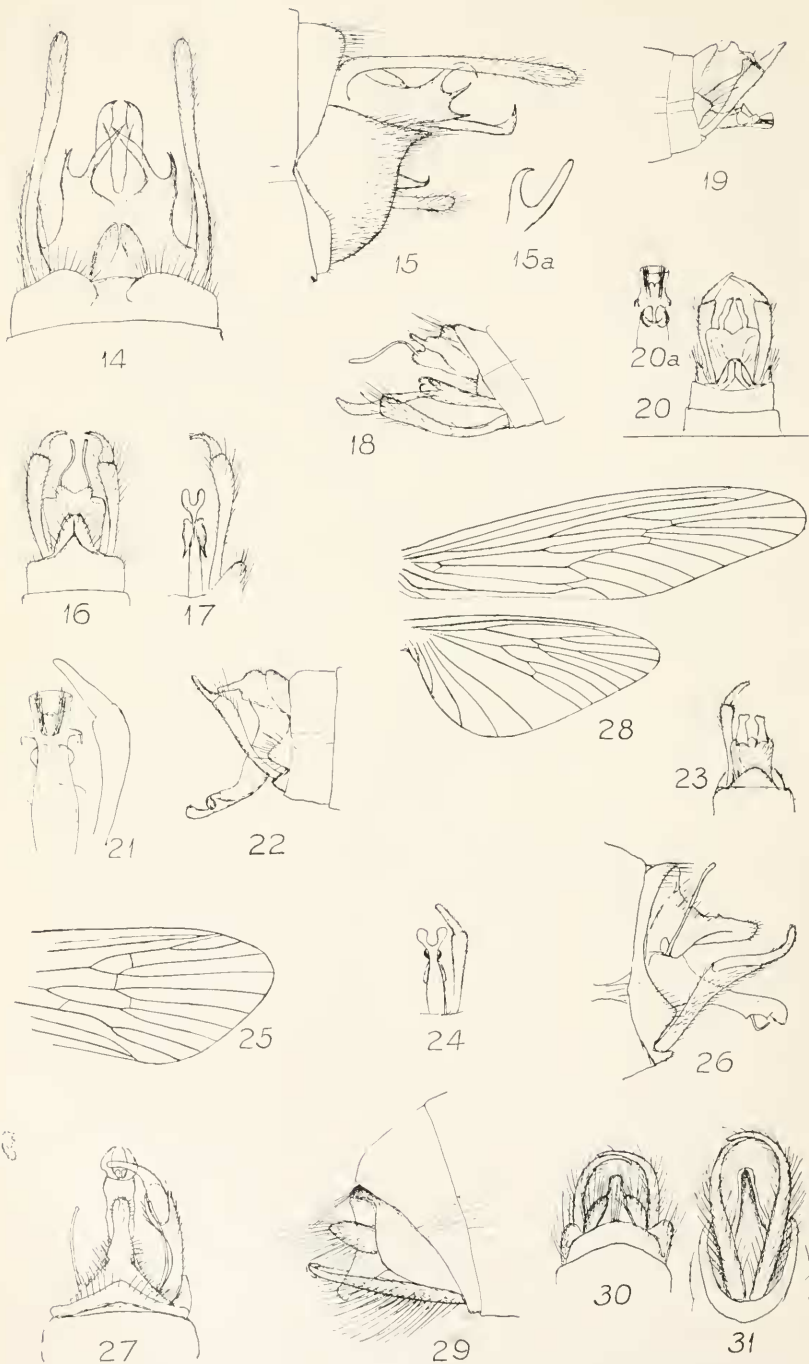
SPECIES OF RHYACOPHILA, GLOSSOSOMA, AND STENOPSYCHE
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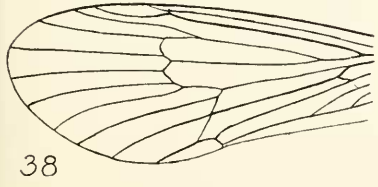
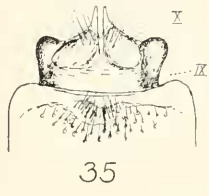
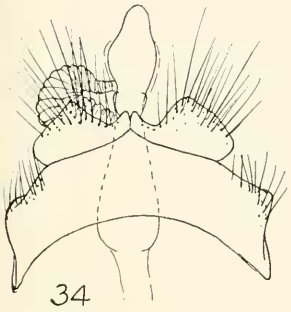
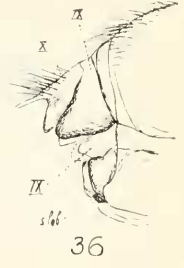
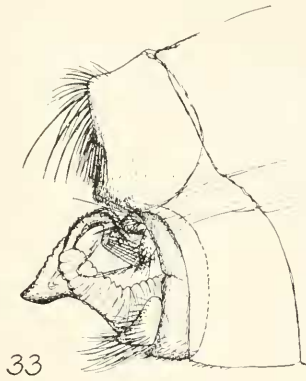
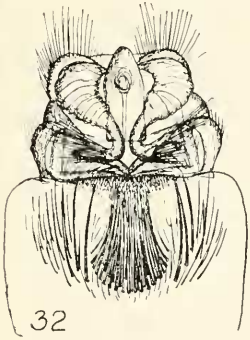
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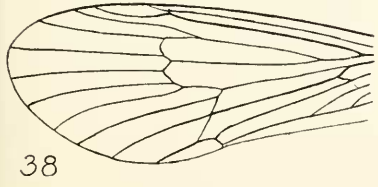
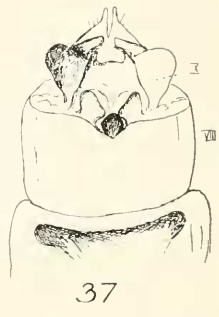
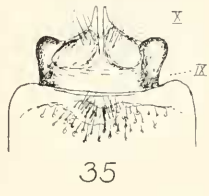
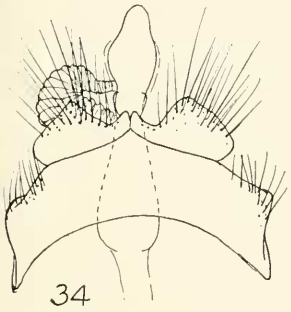
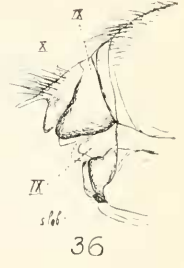
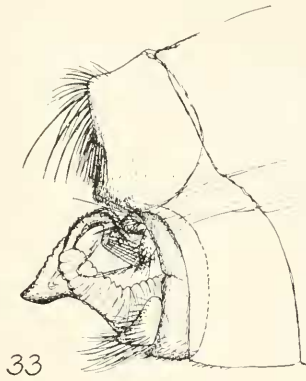
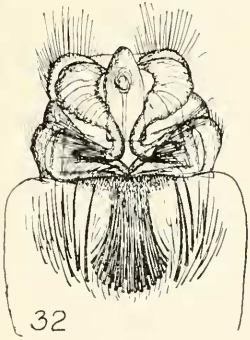
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SPECIES OF STENOPSYCHE, HYDROPSYCHE, HYDROMANICUS, AND ASOTOCERUS
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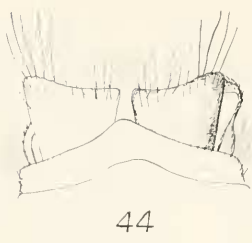
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SPECIES OF PSEUDOSTENOPHYLAX
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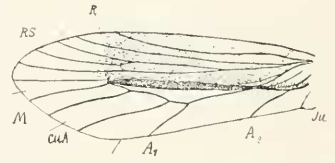
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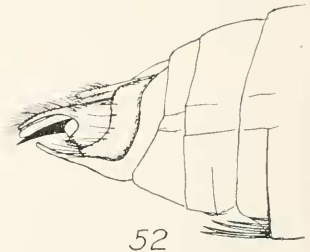
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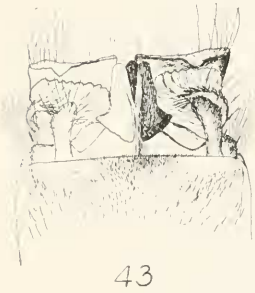
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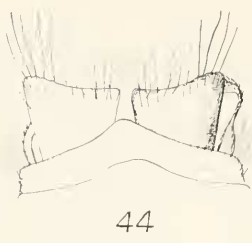
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SPECIES OF PSEUDOSTENOPHYLAX, NOTOPSYCHE, EODINARTHUR, AND GOERA

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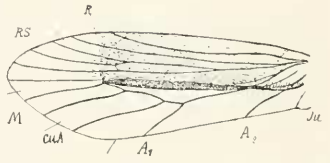
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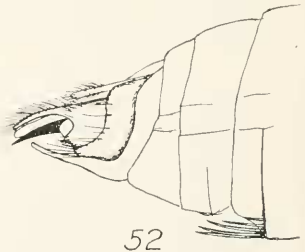
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SPECIES OF PSEUDOSTENOPHYLAX, NOTOPSYCHE, EODINARTHUR, AND GOERA

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